

UTILITY PATENT APPLICATION TRANSMITTAL  
(Large Entity)

*(Only for new nonprovisional applications under 37 CFR 1.53(b))*

Docket No.

Total Pages in this Submission

**TO THE ASSISTANT COMMISSIONER FOR PATENTS**

Box Patent Application  
Washington, D.C. 20231

Transmitted herewith for filing under 35 U.S.C. 111(a) and 37 C.F.R. 1.53(b) is a new utility patent application for an invention entitled:

## VIDEO SWITCHER

and invented by:

Tsuneaki ISHIMURA and Kazuo NOZAKI

If a **CONTINUATION APPLICATION**, check appropriate box and supply the requisite information.

Continuation    Divisional    Continuation-in-part (CIP) of prior application No.:

Which is a

Continuation  Divisional  Continuation-in-part (CIP) of prior application No.:

Which is a

Continuation  Divisional  Continuation-in-part (CIP) of prior application. No.

Enclosed are:

## Application Elements

1.  Filing fee as calculated and transmitted as described below

2.  Specification having 13 pages and including the following

- a.  Descriptive Title of the Invention
- b.  Cross References to Related Applications (*if applicable*)
- c.  Statement Regarding Federally-sponsored Research/Development (*if applicable*)
- d.  Reference to Microfiche Appendix (*if applicable*)
- e.  Background of the Invention
- f.  Brief Summary of the Invention
- g.  Brief Description of the Drawings (*if drawings filed*)
- h.  Detailed Description
- i.  Claim(s) as Classified Below
- j.  Abstract of the Disclosure

**UTILITY PATENT APPLICATION TRANSMITTAL  
(Large Entity)***(Only for new nonprovisional applications under 37 CFR 1.53(b))*Docket No.  
JEL 31237

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**Application Elements (Continued)**

3.  Drawing(s) (when necessary as prescribed by 35 USC 113)  
a.  Formal Number of Sheets 5  
b.  Informal Number of Sheets \_\_\_\_\_

4.  Oath or Declaration  
a.  Newly executed (original or copy)  Unexecuted  
b.  Copy from a prior application (37 CFR 1.63(d)) (for continuation/divisional application only)  
c.  With Power of Attorney  Without Power of Attorney  
d.  **DELETION OF INVENTOR(S)**  
Signed statement attached deleting inventor(s) named in the prior application,  
see 37 C.F.R. 1.63(d)(2) and 1.33(b).

5.  Incorporation By Reference (usable if Box 4b is checked)  
The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.

6.  Computer Program in Microfiche (Appendix)

7.  Nucleotide and/or Amino Acid Sequence Submission (if applicable, all must be included)  
a.  Paper Copy  
b.  Computer Readable Copy (identical to computer copy)  
c.  Statement Verifying Identical Paper and Computer Readable Copy

**Accompanying Application Parts**

8.  Assignment Papers (cover sheet & document(s))

9.  37 CFR 3.73(B) Statement (when there is an assignee)

10.  English Translation Document (if applicable)

11.  Information Disclosure Statement/PTO-1449  Copies of IDS Citations

12.  Preliminary Amendment

13.  Acknowledgment postcard

14.  Certificate of Mailing  
 First Class  Express Mail (Specify Label No.): \_\_\_\_\_

**UTILITY PATENT APPLICATION TRANSMITTAL  
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Docket No.  
JEL 31237

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**Accompanying Application Parts (Continued)**

15.  Certified Copy of Priority Document(s) *(if foreign priority is claimed)*

16.  Additional Enclosures *(please identify below):*

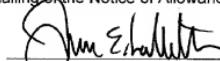
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**Fee Calculation and Transmittal**

CLAIMS AS FILED					
For	#Filed	#Allowed	#Extra	Rate	Fee
Total Claims	14	- 20 =	0	x \$18.00	\$0.00
Indep. Claims	1	- 3 =	0	x \$78.00	\$0.00
Multiple Dependent Claims (check if applicable) <input type="checkbox"/>					\$0.00
					<b>BASIC FEE</b> \$690.00
<b>OTHER FEE (specify purpose)</b> _____					Assignment Recordation Fee \$40.00
					<b>TOTAL FILING FEE</b> \$730.00

A check in the amount of \$730.00 to cover the filing fee is enclosed.  
 The Commissioner is hereby authorized to charge and credit Deposit Account No. 19-4375 as described below. A duplicate copy of this sheet is enclosed.

Charge the amount of \_\_\_\_\_ as filing fee.  
 Credit any overpayment.  
 Charge any additional filing fees required under 37 C.F.R. 1.16 and 1.17.  
 Charge the issue fee set in 37 C.F.R. 1.18 at the mailing of the Notice of Allowance, pursuant to 37 C.F.R. 1.311(b).

  
\_\_\_\_\_  
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Dated: August 30, 2000

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## VIDEO SWITCHER

## BACKGROUND OF THE INVENTION

## Field of the Invention

The invention relates to a video switching apparatus for switching a plurality of video inputs on a time unit basis of a frame, a field, or the like, outputting them to a recording/reproducing apparatus, and outputting reproduction video images from the recording/reproducing apparatus to a monitor.

## Description of the Related Art

10            Hitherto, a video switching apparatus called a frame switcher or a multiplexer is connected to a recording/reproducing apparatus and used. Upon recording, the video switching apparatus switches a plurality of video signals of monitoring cameras or the like on a time unit basis of a frame, a field, or the like, multiplexes an identification (ID) signal to them, and outputs the resultant video signals, and those signals are recorded by the recording/reproducing apparatus.

20            Upon reproduction, the ID signal multiplexed to the video signal reproduced from the recording/reproducing apparatus is read (e.g., by bit reading portion shown herein later) and, when it coincides with a set ID in the video switching apparatus, the video

signal is written in a memory and outputted to a monitor (e.g., by CPU, video input selecting portion, output means). When it does not coincide with the set ID, the video signal is not written in the memory but the video 5 signal written in the memory is outputted to the monitor.

As mentioned above, when the recorded video images are reproduced while switching a plurality of video images by multiplexing the ID signal to the video 10 signal, the ID signal is set by the video switching apparatus and only the video image to which the same ID signal has been multiplexed can be outputted to the monitor.

In the above conventional video switching apparatus, however, there are two kinds of operating modes of a recording mode and a reproducing mode. The recording/reproducing mode of the video switching apparatus has to be manually set in accordance with the operating mode of the recording/reproducing apparatus 15 connected to the video switching apparatus and there is such a problem that if the operating mode is erroneously set, the video signal cannot be correctly recorded/reproduced.

#### SUMMARY OF THE INVENTION

25 The invention intends to solve the above conventional problem and it is an object of the invention to provide an excellent video switching

apparatus which can automatically set a proper operating mode and prevent the erroneous operation.

According to one aspect of the invention, there is provided a video switching apparatus comprising: video input selecting means for switching a plurality of video inputs signals; output means for outputting the switched video input signal to a recording/reproducing apparatus; recording/reproduction detecting means for analyzing a video output of the recording/reproducing apparatus and discriminating whether the recording/reproducing apparatus is in a recording mode or a reproduction mode; and control means for switching its own operation mode to a recording mode or a reproducing mode on the basis of a result determined by the recording/reproduction detecting means.

With this construction, an erroneous operation due to an erroneous setting of the video switching apparatus and the recording/reproducing apparatus can be prevented.

The video switching apparatus of the invention has means for outputting information indicating whether the recording/reproducing apparatus is in the recording mode or reproduction mode to the outside on the basis of the discrimination result of the discriminating means.

With this construction, even from a position where a display or indicator of the recording/reproducing apparatus cannot be seen, by displaying a

state of the signal outputted to the outside, the operating mode of the recording/reproducing apparatus can be confirmed.

#### BRIEF DESCRIPTION OF THE DRAWINGS

5 The features and advantages of the present invention will become more clearly appreciated from the following description taken in conjunction with the accompanying drawings, in which:

10 Fig. 1 is a block diagram of a video switching apparatus in the first embodiment of the invention;

Fig. 2 is a flowchart for a recording/reproduction detecting method in the first embodiment of the invention;

15 Fig. 3 is a block diagram of a video switching apparatus in the second embodiment of the invention;

Fig. 4 is a flowchart for a recording/reproduction detecting method in the second embodiment of the invention; and

20 Fig. 5 is a diagram of a recording/reproduction detecting circuit in the second embodiment of the invention.

#### DESCRIPTION OF THE EMBODIMENTS

Fig. 1 is a block diagram of a video switching apparatus in the first embodiment of the invention.

25 A video switching apparatus 1011 comprises: video input selecting portion 102 for switching a

plurality of video inputs signals; video signal processing means 103 for processing the selected video signal; output means 104 for outputting the video signal; recording/reproduction detecting means 105 for 5 detecting an operating mode of a recording/reproducing apparatus 118; and an internal sync generating circuit 116.

The video signal processing means 103 comprises: a Y/C separator 106 for separating an input 10 video signal into a luminance signal and color difference signals; a decoder 107 for decoding the video signals outputted from the Y/C separator 106; a memory 108 for storing the video signals; an encoder 109 for encoding the video signals; a bit/ID output portion 110 for outputting an ID signal/a bit signal in which H/L of 15 one or a few bits are outputted at random; and a synthesizing portion 111 for multiplexing or adding the bit signal/ID signal to the video signals from the encoder 109.

20 The output means 104 comprises: an output circuit 112 for amplifying the video signal to a proper level and outputting the amplified signal; and a selector 113 for selecting an output destination of the video signal.

25 The recording/reproduction detecting means 105 comprises: a bit reading portion 114 for reading the bit signal multiplexed to the reproduction signal from the recording/reproducing apparatus 118; and a CPU 115 for

controlling the video input selecting portion 102 and selector 113 and setting the bit signal.

A method of detecting the recording/reproduction of the first embodiment of the invention will now be described.

Video output signal in the recording mode and the reproducing mode of the recording/reproducing apparatus 118 will be first described. Usually, the apparatus 118 outputs from its video output terminal the inputted video signal as it is in the recording mode. In the reproducing mode, the video signal recorded on a tape or the like is outputted. That is, in the recording mode, since the video signal outputted from the video switching apparatus 1011 passes through the apparatus 118 and is inputted as it is to the video switching apparatus 1011, the same bit signal as the bit signal set by the CPU 115 can be detected. In the reproducing mode, since the tape which was recorded in the past is reproduced, a bit signal different from the bit signal set by the CPU 115 is detected.

The above recording/reproduction detecting method will now be described with reference to a flowchart of Fig. 2.

The bit signal is detected from the video output signal of the apparatus 118 by the bit reading portion 114 (step 1). When the bit signal is detected, the detected bit signal is compared with the multiplexed bit signal (multiplexed by synthesizing portion 111)

(that is, they are compared by CPU 115) (step 2). When the bit signal cannot be detected or when the detected bit signal and the set bit signal continuously coincide by a length of a few fields, the video switching

5 apparatus is set to the recording mode (by using CPU 115, video input selecting portion 102, etc.) (steps 3 and 5). When the detected bit signal and the set bit signal do not coincide, the video switching apparatus 1011 is set to the reproducing mode (steps 3 and 4).

10 The above method can be also realized by either software or hardware.

When a video transmission cable 119 is not connected from the video output terminal of the apparatus 118 to the input side of the video switching apparatus 1011, since the bit signal cannot be detected by the bit reading portion 114, the video switching apparatus is set to the recording mode.

15 According to the video switching apparatus in the first embodiment of the invention as mentioned above, the multiplexed bit signal of the video output signal of the recording/reproducing apparatus is detected and compared with the set bit signal, thereby enabling the recording/reproducing mode to be automatically switched without using another control line. Even if the video transmission cable is not connected from the apparatus 118 to the video switching apparatus 1011, since the video switching apparatus is 20 in the recording mode, a mistake such that the video

signal cannot be recorded can be prevented.

The second embodiment of the invention will be described with reference to Fig. 3.

Fig. 3 is a block diagram of a video switching apparatus in the second embodiment of the invention.

The apparatus of Fig. 3 differs from that of Fig. 1 with respect to a point that recording/reproduction detecting means 201 comprises: a sync separator 202 for detecting a sync signal from the video output signal of the recording/reproducing apparatus 118; and a reproduction detector 203 for comparing the sync signal detected from the sync separator 202 with a sync signal outputted from the internal sync signal generating circuit 116. ID output portion 204 operates substantially same as the ID output operation of bit/ID output portion 110 shown in Fig. 1.

A recording/reproduction detecting method in the second embodiment of the invention will now be described.

First, a difference between the video output signals of the apparatus 118 in the reproducing mode and the recording mode will be described. Since a mechanical rotational vibration called a wow and flutter of the apparatus 118 exerts an influence on the video output signal in the reproducing mode, stability and precision of the sync signal deteriorate. Generally, since the input signal of the apparatus 118 is outputted as it is as for the video output signal in the recording

mode, it becomes the signal which coincides with the internal sync signal in the video switching apparatus 1013 and the stability as a sync signal is maintained as it is. As mentioned above, the operating mode of the 5 apparatus 118 is detected by the difference in the video output signal of the apparatus 118.

Fig. 4 is a flowchart showing the recording/reproduction detecting method.

A horizontal sync signal is detected from the 10 video output signal of the recording/reproducing apparatus 118 (step 1). A phase difference between the detected horizontal sync signal and an internal horizontal sync signal is detected at time T1 and time T2 (step 2) (e.g.,  $\theta_1$ ,  $\theta_2$ ). The phase differences ( $\theta_1$ , 15  $\theta_2$ ) detected at time T1 and time T2 are compared (step 3). When the phase difference ( $\theta$ ) from the internal horizontal sync signal is equal to 0 or a value which is extremely close to 0 or when the phase differences compared in step 3 are substantially or nearly equal to 20 each other ( $\theta_1 \approx \theta_2$ ), the video switching apparatus is set to the recording mode (steps 4 and 6). If there is a phase difference ( $\theta \neq$  zero) from the internal horizontal sync signal and when the value between the phase differences compared in step 3 are not 25 substantially or nearly equal to each other, i.e., not ( $\theta_1 \approx \theta_2$ ), the video switching apparatus is set to the reproducing mode (steps 4 and 5).

As specific values, when a clock frequency

(e.g., Fig. 5 INTCLK) is equal to 3.2 MHz, if the phase difference ( $\theta$ ) from the internal horizontal sync signal is less than 1  $\mu$ sec, then the apparatus is set to the recording mode; and, when it is equal to or larger than 5 1  $\mu$ sec, then the apparatus is set to the reproducing mode. When a difference of 0.3  $\mu$ sec or more occurs as a value ( $|\theta_1 - \theta_2|$ ) between the phase differences compared in step 3, the apparatus is set to the reproducing mode.

10        Although the case where the number of the comparing operation times is equal to 1 has been described here, it is also possible to discriminate on the basis of data obtained by comparing more than one times in order to improve discriminating precision.

15        Although the horizontal sync signal is used as a signal to be compared, since it is necessary or sufficient that the phase difference can be detected, a composite sync signal (EXT SYNC) which is obtained by sync separator 202 can be also used instead of the 20 horizontal sync signal.

      A specific circuit of the reproduction detector 203 will now be described hereinbelow with reference to Fig. 5.

25        The reproduction detector 203 is constructed by a phase detecting portion 501 and a discriminating portion 502.

      The phase detecting portion 501 comprises: counters 503 and 504; flip-flops (hereinafter, simply

abbreviated to FFs) 505 and 506; an adder/comparator 507; and a timing generating circuit 508. The discriminating portion 502 comprises: a counter 509; a comparator 510; and an FF 511.

5           The timing generating circuit 508 generates timing pulses T1 and T2 from an external sync signal (EXT HD) and an internal sync signal (INT HD). Count values from the counters 503 and 504 are inputted into the FFs 505 and 506 by using the timing pulses T1 and T2  
10          and a relative phase difference is detected by the adder/comparator 507. The counter 509 is made operative by the timing pulses generated by the circuit 508 in order to output several times in response to a respective detection result outputted from the  
15          adder/comparator 507 to the comparator 510 in order to improve precision in the reproduction detection. If detection result outputs compared by the comparator 510 are substantially or nearly equal to each other, it is determined that the apparatus 118 is in the recording  
20          mode. If they are not substantially or nearly equal, it is determined that the apparatus 118 is in the reproducing mode. This operation provides the following merit, for example. In a rare case such that (one time) detection result output at a some timing may be an  
25          erroneous result, the determination can be made by majority logic even with a few erroneous results contained in such several times outputs.

Although the discriminating method has been

described above with hardware, it can be also realized in combination with software.

When the video transmission cable 219 is not connected from the recording/reproducing apparatus 118 to the video switching apparatus 1013, since the external sync signal (EXT HD) is not detected, the FFs 505 and 506 have the same value and it is determined that the apparatus is in the recording mode. In Fig. 5, signals of INTHD, INTCLK, INTVD are generated from 10 internal sync generating circuit 116, and signals of EXTHD, EXTSYNC are obtained from sync separator 202.

The video switching apparatus in the second embodiment of the invention as mentioned above can detect (by sync separator 202) the horizontal sync 15 signal from the video output signal of the apparatus 118, discriminate (by reproduction detector 203) the operating mode of the apparatus 118 on the basis of a relative phase difference between the detected horizontal sync signal and the internal horizontal sync 20 signal, and automatically switch the recording/ reproducing mode. Even if the video transmission cable 219 is not connected from the apparatus 118 to the video switching apparatus 1013, since the video switching apparatus is set in the recording mode, a mistake such 25 that the video signal cannot be recorded can be prevented.

As described above, since the operating mode of the apparatus 118 can be detected in the video

switching apparatus by displaying the operation state or mode of the apparatus 118 by recording/reproduction display 121 or by transmitting a detection result by recording/reproduction detection output means 123, the 5 recording mode of the apparatus can be confirmed even at a remote place such as a monitoring room or the like. The foregoing are described exemplarily for analog video inputs signals, it appears obvious to those skilled that applications of the present inventions for digital video 10 inputs signals are possible and covered by present claims.

As described above, according to the invention, the operating mode of the video switching apparatus can be automatically switched in accordance 15 with the operating mode of the connected recording/ reproducing apparatus without using another control line. An erroneous operation due to a mistake of the setting, particularly, a mistake or failure in the recording can be remarkably reduced, and the operating 20 mode of the recording/reproducing apparatus can be displayed, or a signal indicative of the operating mode can be outputted to the outside. A video switching apparatus having an advantageous effect such that the operating mode of the recording/reproducing apparatus 25 can be confirmed even if a display screen of the recording/reproducing apparatus cannot be seen is provided.

WHAT IS CLAIMED IS:

1. A video switching apparatus comprising:  
video input selecting means for switching to  
select at least one of a plurality of video inputs  
signals;  
output means for outputting the selected video  
input signal to a recording/reproducing apparatus;  
recording/reproduction detecting means for  
analyzing a video signal from said recording/reproducing  
apparatus and discriminating whether the recording/  
reproducing apparatus is in a recording mode or a  
reproduction mode; and  
control means for switching its own operation  
mode to a recording mode or a reproducing mode on the  
basis of a result determined by said recording/  
reproduction detecting means.
2. An apparatus according to claim 1, wherein  
said recording/reproduction detecting means has  
discriminating means for comparing a signal set at  
random in said video switching apparatus with a signal  
multiplexed in a video output signal of said  
recording/reproducing apparatus and discriminating  
whether said recording/reproducing apparatus is in the  
recording mode or the reproduction mode on the basis of  
a comparison result.
3. An apparatus according to claim 1, wherein  
said recording/reproduction detecting means includes  
discriminating means for comparing in phase a sync

signal of the video signal which is outputted to said recording/reproducing apparatus with a sync signal separated from the video signal outputted from said recording/reproducing apparatus and determining that said recording/reproducing apparatus is in the recording mode in the case where the comparison result indicates that phases of the compared sync signals are nearly equal to each other.

4. An apparatus according to claim 1, wherein said recording/reproduction detecting means includes discriminating means for comparing in phase a sync signal of the video signal which is outputted to said recording/reproducing apparatus with a sync signal separated from the video signal outputted from said recording/reproducing apparatus and determining that said recording apparatus is in the reproduction mode in the case where the comparison result indicates phases of the compared sync signals are not nearly equal to each other.

5. An apparatus according to claim 1, wherein said recording/reproduction detecting means includes: discriminating means for comparing a horizontal sync signal of the video signal which is outputted to said recording reproducing apparatus with a horizontal sync signal separated from the video signal outputted from said recording/reproducing apparatus and discriminating whether said recording/reproducing apparatus is in the recording mode or the reproducing mode; and control

means for switching an operating mode to the recording mode or the reproducing mode on the basis of a discrimination result of said discriminating means.

6. An apparatus according to claim 1, wherein said recording/reproduction detecting means includes discriminating means for determining that said recording/reproducing apparatus is in the recording mode when a video transmission cable from said recording/reproducing apparatus is not connected.

7. An apparatus according to claim 1, further comprising means for displaying information indicating whether said recording/reproducing apparatus is in the recording mode or the reproduction mode on the basis of a discrimination result of said discriminating means.

8. An apparatus according to claim 2, further comprising means for displaying information indicating whether said recording/reproducing apparatus is in the recording mode or the reproduction mode on the basis of a discrimination result of said discriminating means.

9. An apparatus according to claim 3, further comprising means for displaying information indicating whether said recording/reproducing apparatus is in the recording mode or the reproduction mode on the basis of a discrimination result of said discriminating means.

10. An apparatus according to claim 4, further comprising means for displaying information indicating whether said recording/reproducing apparatus is in the recording mode or the reproduction mode on the basis of

a discrimination result of said discriminating means.

11. An apparatus according to claim 1, further comprising means for outputting information indicating whether said recording/reproducing apparatus is in the recording mode or the reproduction mode to an outside on the basis of a discrimination result of said discriminating mean.

12. An apparatus according to claim 2, further comprising means for outputting information indicating whether said recording/reproducing apparatus is in the recording mode or the reproduction mode to an outside on the basis of a discrimination result of said discriminating mean.

13. An apparatus according to claim 3, further comprising means for outputting information indicating whether said recording/reproducing apparatus is in the recording mode or the reproduction mode to an outside on the basis of a discrimination result of said discriminating mean.

14. An apparatus according to claim 4, further comprising means for outputting information indicating whether said recording/reproducing apparatus is in the recording mode or the reproduction mode to an outside on the basis of a discrimination result of said discriminating mean.

ABSTRACT OF THE DISCLOSURE

A video switching apparatus in which an operating mode (recording/reproduction) of a recording/reproducing apparatus is discriminated from a video output signal of the recording/reproducing apparatus by recording/reproduction detecting portion, thereby enabling an automatic switching of a setting mode of the video switching apparatus. It is possible to prevent recording failures which may be otherwise caused due to an inconsistency between the mode settings of the video switching apparatus and the recording/reproducing apparatus connected thereto.

FIG. 1

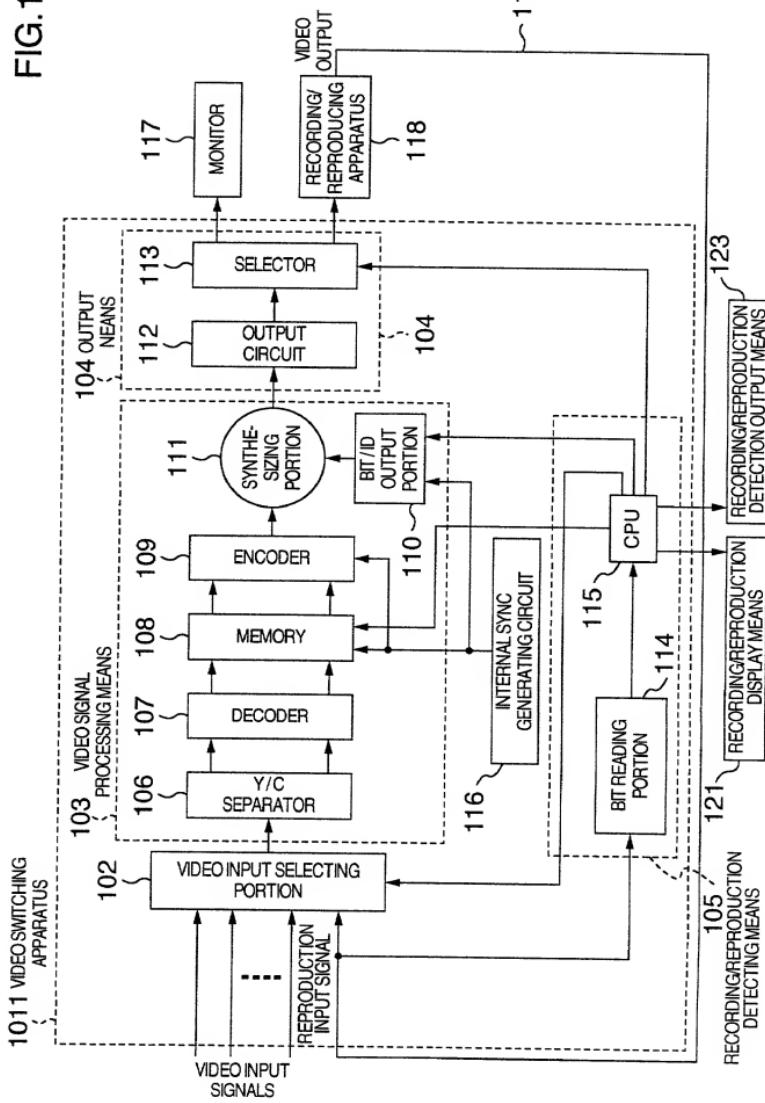


FIG.2

st.1

READ BIT SIGNAL FROM  
VIDEO OUTPUT SIGNAL OF  
RECORDING/REPRODUCING  
APPARATUS

st.2

IS THERE  
BIT SIGNAL  
?

N

st.3

CONTINUOUSLY  
COINCIDES  
WITH SET BIT  
?

Y

st.4

SET TO  
REPRODUCING MODE

st.5

SET TO  
RECORDING MODE

1013 VIDEO SWITCHING APPARATUS

FIG.3

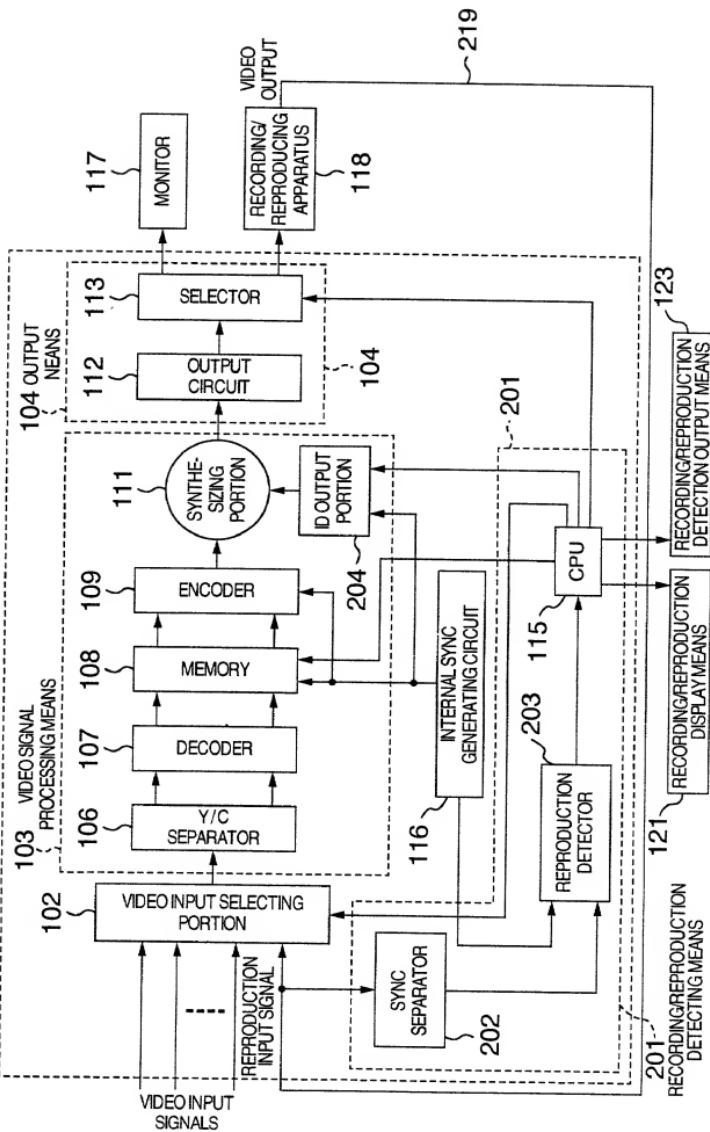


FIG.4

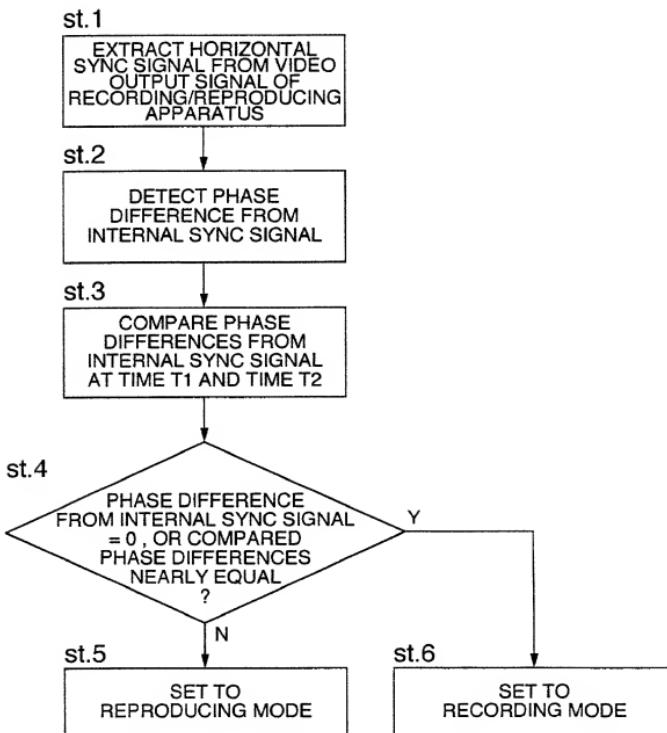
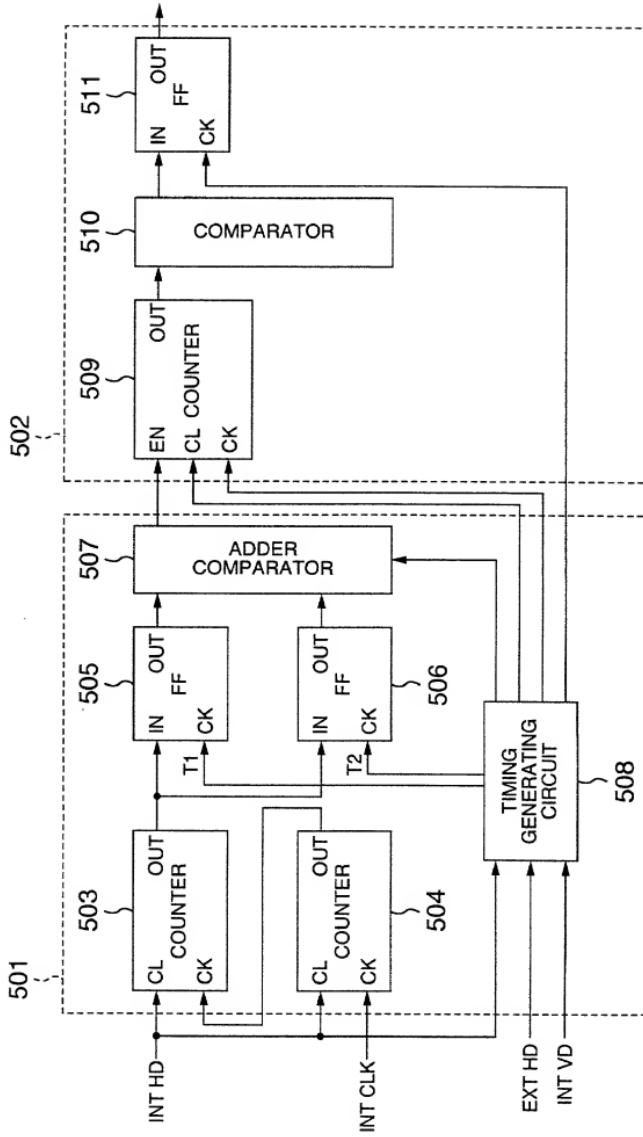


FIG.5



E5406-01(1)

**APPLICATION FOR UNITED STATES PATENT**  
**Declaration for Patent Application**

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: 1. "VIDEO SWITCHER"

the specification of which  
 (check at least one)  
 3 [X] is attached hereto  
 4 [ ] was filed on \_\_\_\_\_ as (5) U.S. Application Serial No. \_\_\_\_\_  
 6 [ ] and was amended on \_\_\_\_\_  
 (if applicable)

Use this portion Only if there are none in the U.S.	7 [ ] was filed as PCT international application
National phase based on a PCT International Application designating the U.S.	8 Number _____ 9 on _____ 10 and was amended under PCT Article(s) 19 and/or 34 on _____ (if applicable)

I hereby declare that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended, by any amendment referred to above.

I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me which is material to patentability in accordance with Title 35, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 or 365 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date earlier than that of the application(s) on which priority is claimed.

Prior (Foreign) Application(s) any Priority Claims Under 35 U.S.C. 119 or 365 Priority Claimed

11a	Japan (Country)	11-244722 (Number)	August 31, 1999 (Day/Month/Year Filed)	[X] [ ] Yes No
				[ ] [ ] Yes No
				[ ] [ ] Yes No

[ ] Additional foreign application numbers are listed on a supplemental priority data sheet attached hereto.

Priority Claim(s) from U.S. Provisional Application(s) - I hereby claim the benefit under Title 35, United States Code, §119(e) of any United States provisional application(s) listed below:

11b	Application No.	Day/Month/Year Filed	Application No.	Day/Month/Year Filed
	[ ] Additional provisional application numbers are listed on a supplemental priority data sheet attached hereto.			

Do not use this portion to identify a PCT application If a parent application is the U.S. National phase of the PCT application	I hereby claim the benefit under Title 35, United States Code, 120 of any United States application(s) or under Title 35, United States Code, 365 of any PCT international application(s) designating the United States of America that is/are listed below and, as far as the subject matter of each of the claims of this application is concerned, is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code §112, I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, §1.56 which became available between filing date of the prior application and the national or PCT international filing date of this application.			
	12	(U.S. Parent Application or PCT Parent Number)	(Parent Filing Date)	Status (patented, pending, abandoned)
	[ ] Additional U.S. or PCT international application numbers are listed on a supplemental priority data sheet attached hereto.			

I hereby appoint the following attorneys of the firm of Stevens, Davis, Miller & Mosher, L.L.P. as my attorneys of record with full power of substitution and revocation to prosecute this application and to transact all business in the Patent and Trademark Office: James E. Ledbetter, Reg. No. 28732; Thomas P. Pavelko, Reg. No. 31689; and Anthony P. Venturino, Reg. No. 31674.

**ALL CORRESPONDENCE IN CONNECTION WITH THIS APPLICATION SHOULD BE SENT TO STEVENS, DAVIS,  
 MILLER & MOSHER, L.L.P., 1615 L Street, N.W., Suite 850, Washington, D.C. 20036, TELEPHONE (202) 408-5100,  
 FACSIMILE (202) 408-5200.**

E5406-51 10

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful statements may jeopardize the validity of the application or any patent issuing thereon.

13a	Typewritten Full Name of Sole or First Inventor		
	<u>Tsuneaki ISHIMURA</u>		
	Given Name	Middle Name	Family Name
14a	Inventor's Signature		
	<u>Tsuneaki</u>		
15a	Date of Signature	A	
	<u>August 21, 2000</u>		
	Month	Day	Year
16a	Residence	<u>Yokohama, Japan</u>	
	City	State or Province	Country
17a	Citizenship	<u>Japan</u>	
18a	Post Office Address (Insert complete mailing address, including country)	<u>2710-61, Mihocho, Midori-ku, Yokohama-shi, Japan.</u>	
13b	Typewritten Full Name of Second Inventor		
	<u>Kazuo NOZAKI</u>		
	Given Name	Middle Name	Family Name
14b	Inventor's Signature	A	
	<u>Kazuo</u>		
15b	Date of Signature	A	
	<u>August 21, 2000</u>		
	Month	Day	Year
16b	Residence	<u>Yokohama, Japan</u>	
	City	State or Province	Country
17b	Citizenship	<u>Japan</u>	
18b	Post Office Address (Insert complete mailing address, including country)	<u>2645-103, Ikonobecho, Tsuzuki-ku, Yokohama-shi, Japan.</u>	
13c	Typewritten Full Name of Third Inventor		
	Given Name	Middle Name	Family Name
14c	Inventor's Signature	A	
15c	Date of Signature	A	
	Month	Day	Year
16c	Residence	<u>City</u>	
	State or Province	Country	
17c	Citizenship	<u></u>	
18c	Post Office Address (Insert complete mailing address, including country)	<u></u>	